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ABSTRACT

3 A ceramic fuel cell(s) is supported in a heat
4 conductive interconnect plate, and a plurality of plates
5 form a conductive heater named a stack. Connecting a
6 plurality of stacks forms a stick of fuel cells. By
7 connecting a plurality of sticks end to end, a string of
8 fuel cells is formed. The length of the string can be one
9 thousand feet or more, sized to penetrate an underground
10 resource layer, for example of oil. A pre-heater brings the
11 string to an operating temperature exceeding 700° C., and
12 then the fuel cells maintain that temperature via a
13 plurality of conduits feeding the fuel cells fuel and an
14 oxidant, and transferring exhaust gases to a planetary
15 surface. A manifold can be used between the string and the
16 planetary surface to continue the plurality of conduits and
17 act as a heat exchanger between exhaust gases and
18 oxidants/fuel.

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